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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,631	09/29/2004	Arthur I. Watson	68.0417	5630

35204 7590 11/12/2009

SCHLUMBERGER RESERVOIR COMPLETIONS
14910 AIRLINE ROAD
ROSHARON, TX 77583

EXAMINER	
FULLER, ROBERT EDWARD	
ART UNIT	**PAPER NUMBER**
3676	

NOTIFICATION DATE	DELIVERY MODE
11/12/2009	ELECTRONIC

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/711,631
Filing Date: September 29, 2004
Appellant(s): WATSON ET AL.

Robert A. Van Someren
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed July 24, 2009 appealing from the Office action mailed January 16, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is substantially correct. The rejections of claims 6, 20, 39, 40 has been withdrawn, as set forth below. Claims 39 and 40 are allowed. Claims 6 and 20 are objected to. Claims 2, 12, 21, 36-38, 41, 42, 46 and 52-56 are canceled. Claims 1, 3-5, 7-11, 13 -19, 22-35, 43-45, 47-51 are on appeal.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

Claims 39 and 40 are unpatentable under 35 U.S.C. 102(b) as anticipated by the Shilman reference, RU 2162272 C1.

Claim 6 is unpatentable under 35 U.S.C. 103(a) as being obvious over the Shaw et al. reference in view of the Scarsdale reference and further in view of the Shilman reference.

Claim 20 is unpatentable under 35 U.S.C. 103(a) as being obvious over the Shaw et al. reference in view of the Shilman reference.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,667,737	SHAW ET AL.	5-1987
2005/0087343	DU ET AL.	4-2005
6,290,430	SCARSDALE	9-2001
6,091,175	KINSINGER	7-2000
4521708	VANDEVIER	6-1985
6,602,059	HOWELL ET AL.	8-2003
6,854,556	YAMAMOTO ET AL.	2-2005
6,394,220	KUROKAWA ET AL.	5-2002
6,398,521	Yorulmazoglu	6-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 16-19, 22, 25-28, and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Shaw et al. (US 4,667,737).

With regard to claim 16, Shaw discloses forming a motive unit by connecting a motor section shaft (1d) to a protector section shaft (5) to form an axially affixed connection (wherein the axis is transverse to the longitudinal axis of the motive unit); placing a sealed housing (20) about the axially affixed connection to form a combined motor section and protector section, prefilling the combined motor section and protector section with a lubricating fluid prior to delivery of the combined motor section and protector section to a wellbore location (where the wellbore location is a downhole location—see column 2, lines 3-7), and forming a protector section head (40) with lateral sand escape holes (41) disposed above a protector section bearing (48).

With regard to claim 17, Shaw discloses placing the motive unit downhole.

With regard to claim 18, the motor shaft and protector shaft are connected when the housings are connected via threaded couplers (1c).

With regard to claim 19, Shaw discloses threadably engaging the motor protector housing with the motor housing (via threaded bolts 1c).

With regard to claim 22, Shaw discloses replaceable wear sleeves (26, 48).

With regard to claim 25, Shaw discloses forming oil communication holes (25d, 30h) at an angle with respect to an axis of the combined motor section and protector section.

With regard to claim 26, Shaw teaches a method for protecting a submersible motor, comprising: constructing a motive unit having a longitudinal axis for a submersible pumping system with a motor section (1) and a protector section (10) combined; delivering the motive unit to an oil production well as a single unit; and providing the motive unit with a plurality of oil communication holes (30h, 25d) deployed at an a nonzero angle with respect to the longitudinal axis such that the nonzero angle of the plurality of oil communication holes corresponds with an angle at which the motive unit is positioned relative to vertical during filling of the motive unit with oil.

With regard to claim 27, Shaw teaches prefilling the motive unit with a lubricating oil prior to delivering the motive unit to the production well (the motive unit is filled with oil prior to being placed in the well).

With regard to claim 28, Shaw teaches axially connecting a motor section shaft with a protector section shaft.

With regard to claim 30, Shaw discloses permanently connecting the shafts using a coupling sleeve (2).

With regard to claim 31, Shaw provides a sand escape hole (41) in the protector head.

With regard to claim 32, Shaw discloses journal bearings having replaceable wear sleeves (26, 48).

Claims 47-51 are rejected under 35 U.S.C. 102(e) as being anticipated by Du et al. (US 2005/0087343).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

With regard to claim 51, Du discloses a system for use in pumping a fluid from well, comprising: an electric submersible pumping system (10) having a motor section (14) and a protector section (16), wherein at least one of the motor section and the protector section comprises a bubble sump (88) to maintain any released gases in a dedicated volume, further comprising a relief valve system (94) in communication with the dedicated volume to vent gas from the bubble sump (see paragraph 0030).

With regard to claim 47, Du is silent as to how the protector and motor unit are manufactured. However, Figure 1 shows the motor and protector as a single unit. MPEP 2113 Product-by-Process Claims states that "If the product in the product-by-process claim is that same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process." In other words, Du shows the motor and protector as a single unit, therefore, it does not matter whether the motor and protector were assembled at a manufacturing plant or afterward, at a well site prior to insertion into a well. The process by which the combined motor and protector is made is not a patentable distinction. Furthermore, examiner considers "manufacturing" to encompass both assembly at a factory and

assembly at a well site prior to insertion downhole. "Manufacturing" does not necessarily mean only that which occurs at a manufacturing plant.

With regard to claim 48, the bubble sump (88) is disposed in the protector section (16).

With regard to claim 49, the bubble sump comprises a framework (38, 40) having the dedicated volume.

With regard to claim 50, portions of the framework are above protector bags (48).

Claims 1, 3-5, 7, 8, 15, 23, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 4,667,737) in view of Scarsdale (US 6,290,430).

With regard to claims 1, 23, and 33, Shaw discloses a system for producing oil, comprising a submersible pump (not shown, but connectable to end of shaft at 5b - see column 3, lines 19-20), and a motive unit to power the submersible pump, the motive unit being a single device with a motor section (1) and motor protector section (10) to seal the motor section from surrounding fluid and to accommodate thermal expansion of an internal lubricating fluid during production of oil, wherein the motive unit comprises a plurality of bearings (26, 48), wherein the motor section comprises a motor section shaft (1d) and the motor protector section comprises a motor protector section shaft (5), the motor section shaft and the motor protector section shaft being axially affixed to each other with respect to the longitudinal axis of the motive unit.

Shaw fails to disclose the plurality of bearings having self-lubricating bushings.

Scarsdale discloses a submersible motor apparatus (42) for producing fluid from a well, comprising self-lubricating bushings (70).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the bushings of Shaw to be the self-lubricating type disclosed by Scarsdale, as Scarsdale states that "self-lubricating bearings promote the longevity of electric submergible pumping systems" (see column 4, lines 64-66).

With regard to claims 3-5, Shaw discloses a splined connection between the motor section shaft and the motor protector section shaft, but fails to disclose a threaded or cross bolt connection.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have provided a threaded connection, cross-bolt connection, or interference fit connection in place of the splined connection disclosed by Shaw, as examiner hereby takes Official Notice that any of these equivalent connections would have been equally effective at affixing the two shafts with respect to an axis transverse to the longitudinal axis of the motive unit, and further because applicant has provided no criticality for the selection of one type of connection over the other, as evidenced by the fact that applicant has claimed all three types of connections. *See column 6, lines 39-44, of Yorulmazoglu (US 6,398,521) for supporting evidence. Yorulmazoglu discloses a submersible pump assembly where "splines may be substituted with various shaft coupling structures including a key-way, interference fit, threaded connector, welding, cross-bolts, pins, hex-shaped bodies, etc."*

With regard to claim 7, Shaw discloses a protector section head (40) with lateral sand escape holes (41) disposed above a protector section bearing (48).

With regard to claim 8, Shaw discloses a shroud (50) protecting a bearing (42).

With regard to claim 15, Shaw discloses a plurality of oil communication holes (25d, 30h) deployed at an angle with respect to the longitudinal axis of the motive unit.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. in view of Scarsdale as applied to claim 1 above, and further in view of Kinsinger (US 6,091,175).

With regard to claims 9 and 10, Shaw discloses conventional journal bearings (42, 48, 26, etc.) having replaceable wear sleeves. However, Shaw does not disclose a dual-sleeve setup, in which an inner sleeve is attached to and rotates with the shaft, and an outer sleeve is attached to the housing.

Kinsinger discloses a bearing assembly for a submersible pump motor comprising a journal bearing having a replaceable wear sleeve (48), which is non-rotatably connected to the shaft (26) via a key (see column 4, lines 30-34), and is made of a soft metal such as bronze or brass (see column 4, lines 56-57). Therefore, though not explicitly stated, the wear sleeves of Kinsinger appear to be designed to bear the brunt of the wear due to friction as they are made of a soft metal.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have provided the bearings of Shaw in view of Scarsdale with a dual-sleeve setup as disclosed by Kinsinger, in order to have absorbed

the friction caused by rotation of the shaft, thereby preventing undue wear to the shaft and housing.

With regard to claim 11, Shaw in view of Scarsdale, further in view of Kinsinger simply discloses wear sleeves which are keyed to the shaft, but does not disclose the sleeves being press fit onto the shaft with a tolerance ring.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have used a press fit and tolerance ring connection between the shaft and sleeve rather than the keyed connection taught by Kinsinger, as examiner hereby takes Official Notice of the equivalency of these connections, and furthermore because applicant has not provided any criticality for the choice of one connection over the other, as evidenced by the fact that applicant has claimed both types of connections. *See the rejection of claims 43-45 below, and the Yamamoto et al. (US 6,854,556) and Kurokawa et al. (US 6,394,220) references, which provide evidence of the equivalence of these types of connections.*

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw in view of Scarsdale as applied to claim 1 above, and further in view of Vandevier (US 4,521,708).

Shaw in view of Scarsdale fails to disclose the bearings being rotor bearings with spring-loaded keys.

Vandevier discloses a submersible motor comprising rotor bearings (37) having spring-loaded keys (51).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have provided the bearings of Shaw in view of Scarsdale with spring-loaded keys as disclosed by Vandevier, in order to have provided “a positive means for the bearing to engage the stator to prevent rotation" (see column 3, lines 63-65), thereby reducing “heat and metal surfaces galling which ultimately leads to oil contamination and dielectric breakdown” (see column 1, lines 44-46). The spring-loaded keys would have also allowed "easy insertion of the rotor into the stator" (see column 3, lines 67-68), thereby reducing assembly time.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. in view of Scarsdale as applied to claim 1 above, and further in view of Howell et al. (US 6,602,059).

Shaw in view of Scarsdale fails to disclose placing a sensor within the motor section.

Howell discloses a submersible motor and protector assembly having a sensor (30) within the motor (18).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have included a sensor within the motor of Shaw, as Howell teaches that “one skilled in the art [would have understood] that it can be advantageous to attach an optional sensor to the motor” (column 2, lines 33-36) in order to have enabled an operator at the surface to monitor downhole conditions.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 4,667,737).

Shaw discloses two shafts connected by a sleeve, but fails to disclose providing a single, unitary shaft.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have provided a single, unitary shaft instead of the jointed shaft disclosed by Shaw, in order to have provided for a stronger driveshaft and furthermore because it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1993).

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. in view of Vandevier (US 4,521,708).

Shaw discloses standard single-sleeve journal bearings, but fails to disclose the bearings being rotor bearings with spring-loaded keys.

Vandevier discloses a submersible motor comprising rotor bearings (37) having spring-loaded keys (51).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have provided the bearings of Shaw with spring-loaded keys as disclosed by Vandevier, in order to have provided “a positive means for the bearing to engage the stator to prevent rotation" (see column 3, lines 63-65), thereby reducing “heat and metal surfaces galling which ultimately leads to oil contamination and dielectric breakdown” (see column 1, lines 44-46). The spring-loaded keys would have also allowed "easy insertion of the rotor into the stator" (see column 3, lines 67-68), thereby reducing assembly time.

Claims 24 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. in view of Howell et al. (US 6,602,059).

Shaw fails to disclose placing a sensor within the motor section.

Howell discloses a submersible motor and protector assembly having a sensor (30) within the motor (18).

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have included a sensor within the motor of Shaw, as Howell teaches that "one skilled in the art [would have understood] that it can be advantageous to attach an optional sensor to the motor" (column 2, lines 33-36) in order to have enabled an operator at the surface to monitor downhole conditions.

Claims 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsinger in view of Yamamoto et al. (US 6,854,556) and Kurokawa et al. (US 6,394,220).

With regard to claim 43, Kinsinger discloses a system for producing a fluid, comprising: a motive unit (8) for driving a submersible pump, the motive unit having a journal bearing (see Figure 3) disposed about a drive shaft (26), wherein the journal bearing has a replaceable sleeve (48), wherein the replaceable sleeve is keyed to the shaft. Kinsinger fails to disclose the sleeve being press fit onto the shaft with a tolerance ring.

Yamamoto discloses a sleeve (10) press fit onto a shaft (3c) with a tolerance ring (51--see column 11, lines 50-65, of the '556 patent).

Kurokawa teaches that the sleeve (11) of Yamamoto can be press fit or keyed onto the shaft (3c) of Yamamoto (see column 3, lines 44-46 of the '220 patent). Examiner notes that Yamamoto and Kurokawa are commonly owned patents with very similar figures, therefore the shaft and sleeve are the same in both patents.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have substituted a press-fit connection with a tolerance ring as taught by Yamamoto for the keyed connection taught by Kinsinger, since Kurokawa teaches the functional equivalence of press-fit and keyed connections, and therefore the simple substitution of one equivalent connection type for another would have yielded predictable results.

With regard to claim 44, Kinsinger discloses a plurality of journal bearings that each have a replaceable wear sleeve (see Figure 2).

With regard to claim 45, Kinsinger discloses a motor section (12) and a protector section (10) assembled as a single unit.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

Claims 39 and 40 are unpatentable under 35 U.S.C. 102(b) as anticipated by the Shilman reference, RU 2162272 C1.

Claim 6 is unpatentable under 35 U.S.C. 103(a) as being obvious over the Shaw et al. reference in view of the Scarsdale reference and further in view of the Shilman reference.

Claim 20 is unpatentable under 35 U.S.C. 103(a) as being obvious over the Shaw et al. reference in view of the Shilman reference.

(10) Response to Argument

Examiner will respond to appellant's arguments in the same order in which they were presented in the Appeal Brief filed July 24, 2009.

a.) Appellant argues that 1) Shaw et al. fails to disclose an axially affixed connection between the motor section shaft and the protector section shafts. Appellant further argues that 2) Shaw fails to disclose prefilling the motive unit with oil prior to delivery to a wellbore location, that 3) Shaw fails to disclose delivering the motive unit to an oil production well as a single unit, and that 4) Shaw further fails to disclose the claimed oil communication holes.

Examiner respectfully traverses these arguments.

1) Shaw et al. discloses a splined connection (numerals 5a, 2a, and 2 in Figure 1B) between the shaft (1d) of a motor section (1) and the shaft (5) of a protector section (10). The splined connection enables the motor shaft to transmit torque to the protector section shaft, and collar 2 prevents relative transverse motion, as well as relative rotation between the two shafts. However, appellant incorrectly assumes that "axially affixed" necessarily implies that the shafts are fixed with respect to the *longitudinal* axis of the motive unit (note that, when fully assembled, the shafts are prevented from moving with respect to the longitudinal axis by virtue of bolt connection 1c). In fact, Claim 16 does not specify that the shafts are affixed relative to the longitudinal axis of

the motor and protector sections. For this reason, examiner asserts that Shaw discloses “connecting a motor section shaft to a protector section shaft to form an axially affixed connection,” since Shaw’s shaft connection does not allow motion along at least the transverse axis.

2) Appellant further argues, with respect to claim 16, that prefilling the motive unit at the surface of the well and running the unit downhole does not constitute prefilling “prior to delivery...to a wellbore location”. Appellant argues that a downhole location is not a "wellbore location" in the context defined by the specification. Appellant cites Paragraphs 27 and 41 in support of this argument. Examiner respectfully disagrees, since the phrase “wellbore location” is not found in either Paragraph 27 or Paragraph 41, nor is it found anywhere else in the specification. The phrase “surface location” is found in Paragraph 25, but it is unclear how a "surface location" relates to a "wellbore location." Since the motive unit of Shaw is prefilled with oil prior to being run downhole (this is a well known practice, and Shaw specifically states that oil is filled through passageway 25e, requiring removal and replacement of plug 25g, which could only be accomplished outside of the well—column 5, lines 31-34), examiner maintains that the motive unit is prefilled *prior to* delivery to a wellbore location (i.e. the location downhole where the pump will be placed).

3) Appellant argues, with respect to claim 26, that Shaw’s motive unit is not delivered “to an oil production well” as a single unit. Again, appellant assumes that delivery “to an oil production well" implies delivery from a manufacturing plant to the site of a wellbore operation. Examiner respectfully disagrees with this assumption. While

examiner admits that Shaw is essentially silent as to how the motive unit is assembled together, certain inferences can be made from Shaw's drawings and from what is known in the art. First, Shaw's motive unit is clearly assembled at some location outside of the well (using bolts 1c), perhaps at a location on the rig. It is then moved to a location above the well and in line with the well opening in preparation for insertion into the well. Examiner asserts that even this movement constitutes "delivering the motive unit to an oil production well," since the phrase "oil production well" could encompass merely the well itself.

4) Appellant argues, with respect to claim 26, that Shaw does not disclose oil communication holes "deployed at a nonzero angle with respect to the longitudinal axis such that the nonzero angle of the plurality of oil communication holes corresponds with an angle at which the motive unit is positioned relative to vertical during filling of the motive unit with oil." Examiner respectfully disagrees. Shaw certainly discloses oil communication holes deployed at a nonzero angle with respect to the longitudinal axis. Holes 30h and 25 are disposed at a nonzero angle with respect to the longitudinal axis and communicate oil to the various parts of the protector unit, such as thrust bearing 70, sleeve bearings 26, 48, etc. The remaining question is whether the angle of those holes "corresponds with an angle at which the motive unit is positioned relative to vertical during filling of the motive unit with oil." Appellant is correct in that Shaw is largely silent as to how exactly the motive unit is filled with oil. However, it stands to reason that the motive unit would be placed at some angle with respect to the vertical during filling (note that this angle could include 90 degrees, such that the motive unit is simply laid on the

ground), so that the oil would not simply flow backwards out of hole 25f. The key to examiner's argument is that the word "corresponds" is essentially meaningless in this context. *Correspondence* does not imply *equivalence*, nor does the claim actually define what sort of correspondence is intended. Are the angles equal? Do they differ by 30 degrees? By 45 degrees? Therefore, examiner's conclusion is that, if Shaw discloses oil communication holes disposed at an angle (which Shaw clearly does), and if Shaw's device is deployed at an angle during filling (which is has to be, in order to eliminate spillage), then the angle of the holes will certainly correspond in some way with the angle of filling. Exactly *how* they correspond is irrelevant, since the claim does not actually define what correspondence means.

b.) Note that examiner has withdrawn all rejections based on the Shilman reference.

c.) Appellant argues that Du et al. fails to disclose a "bubble sump." Appellant states that Du et al. "teaches an approach for venting gas rather than providing a sump for collecting gas."

Examiner respectfully disagrees with this argument. A "sump" is simply a storage space. Appellant appears to argue that because item 88 is referred to as a "passageway," then it cannot *store* anything. Examiner points out that the passage is closed off by a valve 94. When the motive unit is being filled with oil, and the venting of gases is desired, valve 94 will be opened (see paragraph 0030), as gases will escape from passage 88. When venting is not needed, such as when the unit is downhole and in use, valve 94 will be closed since opening the valve could cause entry of well fluids

into passage 88 (note that chamber 66 is open to well fluids at 72). When valve 94 is closed, then gases (i.e. bubbles) will be stored within passage 88. Therefore, examiner maintains that passage 88 can be called a "bubble sump" as claimed.

d.) Appellant argues that 1) Shaw fails to disclose an axially affixed connection between the motor section shaft and the protector section shaft, and that 2) Yorulmazoglu is improperly relied on to teach the equivalency of the connections claimed in claims 3-5.

1) Claim 1 recites a "motive unit" having a motor section shaft and a protector section shaft that are "axially affixed to each other with respect to a longitudinal axis of the motive unit." Shaw shows a motive unit (which is the combination of motor 1 and protector 10) with a motor shaft 1d and a protector shaft 5. When Shaw's motive unit is assembled and in use, the two shafts do not move longitudinally relative to each other, since the motor housing and protector housing are fixed together by bolts 1c, and a pump is connected to the upper end of the protector at 5b (see column 3, lines 18-20). In fact, if the shafts were not axially affixed, the device would become inoperable since corresponding splines would no longer engage with each other and the motor shaft 1d would not be able to drive the pump shaft since it would be disconnected from protector shaft 5.

2) Appellant alleges that Yorulmazoglu does not support the taking of Official Notice regarding the equivalency of splines, press-fits, cross-bolts, and threads for connecting torque-transmitting shafts, since Shaw "relies" on the severability of the shaft connection for ease of disassembling the motor and motor protector. Examiner

disagrees. Shaw does not actually state anything about a splined connection being necessary to facilitate disassembly of the device. The only thing Shaw "relies" on is that the two shafts must be able to transmit torque. Splined, press-fit, cross-bolt, and threaded connections can all transmit torque. Furthermore, contrary to appellant's assertions, each of those connections are, in fact, separable. A threaded connection, for example, is no more permanent than a splined connection. Therefore, changing the splined connection of Shaw to a different type of connection would not destroy Shaw at all. The only way changing the shaft connection could destroy Shaw is if the particular connection prevented the transmission of torque, and that is clearly not the case with Yorulmazoglu.

e.) Examiner notes again, that rejections based on the Shilman reference are withdrawn.

f.) Appellant argues that the references cited in rejecting claims 9-11 do not cure the deficiencies in Shaw, namely that Shaw fails to disclose an axially affixed connection. Appellant further argues that the Kinsinger references does not support the taking of Official Notice with respect to the equivalency of tolerance ring and keyed connections.

Examiner respectfully disagrees, and maintains that Shaw does disclose an axially affixed connection, as discussed above. With respect to claim 11 and the taking of Official Notice, examiner refers to letter **m.)** below, which discusses the Kinsinger, Yamamoto, and Kurokawa references.

g.), h.) Appellant argues that the teaching references cited do not cure the deficiencies in Shaw, since Shaw fails to teach all the limitations in the independent claims. However, examiner maintains that Shaw does teach the limitations of independent claim 1, as discussed above.

i.) Examiner notes again that rejections based on the Shilman reference are withdrawn.

j.), k.), l.) Appellant argues that the teaching references cited do not cure the deficiencies in Shaw, since Shaw fails to teach all the limitations in the independent claims. However, Examiner maintains that Shaw does teach the limitations of independent claims 16 and 26, as discussed above.

m.) Appellant argues that 1) the Kinsinger reference teaches away from a press fit connection between sleeve 48 and the shaft, since Kinsinger's sleeve 48 needs to be able to move in the axial direction. Appellant further argues that 2) neither Kurokawa nor Yamamoto teaches or suggests connecting a sleeve to a shaft by press-fitting with a tolerance ring.

1) Examiner respectfully traverses appellant's arguments. While Kinsinger does state that the sleeves are not axially "locked" to the shaft, examiner asserts that the press fit connection suggested by Yamamoto does not imply axial locking. Since a press fit is simply a friction fit, axial movement is possible, so long as the force causing the movement is enough to overcome the force of friction. This is in contrast to a true "locked" connection, such as a transverse pin, in which the force required to initiate relative axial movement would need to exceed the shear strength of the pin.

Furthermore, the amount of axial movement permitted in Kinsinger is quite small anyway, since the sleeve 48 is sandwiched between two washers 64. Therefore, Kinsinger does not teach away from a combination with Kurokawa and Yamamoto, since the Yamamoto connection would still allow a certain amount of axial movement.

2) Appellant argues that Yamamoto teaches a torque limiter 11' having a torque setting member 51. Examiner points out that the torque limiting member *is* a tolerance ring (see column 8, line 53). Therefore, Yamamoto does in fact teach a sleeve 10 which is press fit onto a shaft 3 using a tolerance ring 51. Kurokawa merely provides the teaching that a keyed connection is equivalent to a press fit connection, thereby providing the link between the Yamamoto and Kinsinger references.

In conclusion, the combined teachings of Kinsinger, Yamamoto, and Kurokawa show that it would have been considered obvious to one of ordinary skill in the art, at the time of invention, to have provided a journal bearing with a replaceable wear sleeve within a submersible motor, and to have connected that journal bearing to the wear sleeve by press-fitting with a tolerance ring.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Robert Fuller /REF/

/David J. Bagnell/

Supervisory Patent Examiner, Art Unit 3672

Conferees:

David J. Bagnell /DJB/

Darnell Jayne /dj/